Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL GUIDELINE CLEARINGHOUSE

General

Guideline Title

Shoulder disorders.

Bibliographic Source(s)

Shoulder disorders. In: Hegmann KT, editor(s). Occupational medicine practice guidelines. Evaluation and management of common health problems and functional recovery in workers. 3rd ed. Elk Grove Village (IL): American College of Occupational and Environmental Medicine (ACOEM); 2011. p. 1-297. [1977 references]

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Shoulder complaints. Elk Grove Village (IL): American College of Occupational and Environmental Medicine (ACOEM); 2004. 31 p. [68 references]

Regulatory Alert

FDA Warning/Regulatory Alert

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- March 22, 2016 – Opioid pain medicines : The U.S. Food and Drug Administration (FDA) is warning about several safety issues with the entire class of opioid pain medicines. These safety risks are potentially harmful interactions with numerous other medications, problems with the adrenal glands, and decreased sex hormone levels. They are requiring changes to the labels of all opioid drugs to warn about these risks.

Recommendations

Major Recommendations

Definitions for the strength of evidence ratings (A, B, C, and I) and the criteria for evidence-based recommendations are presented at the end of the "Major Recommendations" field.

Summary Tables: Recommendations and Evidence

Table 1 summarizes the recommendations from the Evidence-based Practice Shoulder Panel for diagnostic testing for shoulder disorders. Table 2 summarizes recommendations for managing these disorders. Table 3 summarizes the recommendations for using ergonomic interventions and return-to-work programs. Recommendations are based on critically appraised higher quality research evidence and on expert consensus observing First Principles when higher quality evidence was unavailable or inconsistent. The reader is cautioned to utilize the more detailed indications, specific appropriate diagnoses, temporal sequencing, prior testing or treatment, and contraindications that are elaborated in more detail for each test or treatment in the body of this Guideline in using these recommendations in clinical practice or medical management. These recommendations are not simple "yes/no" criteria, and the evidence supporting them is in nearly all circumstances developed from typical patients, not unusual situations or exceptions. (Studies were reviewed that included numerous disparate conditions beyond shoulder pain; however, they are not included in this chapter in detail. The reader is also referred to other chapters, especially the Chronic Pain chapter for a detailed review of many of those additional studies.)

Recommendations are made under the following categories:

- Strongly Recommended, "A" Level
- Moderately Recommended, "B" Level
- Recommended, "C" Level
- Insufficient-Recommended (Consensus-based), "I" Level
- Insufficient-No Recommendation (Consensus-based), "I" Level
- Insufficient-Not Recommended (Consensus-based), "I" Level
- Not Recommended, "C" Level
- Moderately Not Recommended, "B" Level
- Strongly Not Recommended, "A" Level

Table 1. Summary of Recommendations for Diagnostic and Other Testing for Shoulder Disorders

Test	Recommendation(s)
Antibodies	Antibody levels to evaluate and diagnose patients with shoulder pain that have reasonable suspicion of rheumatological disorder. – Recommended, Insufficient Evidence (I) However, ordering of a large, diverse array of antibody levels without targeting a few specific disorders diagnostically is not recommended. Antibody levels as a screen to confirm specific disorders (e.g., rheumatoid arthritis) – Strongly Recommended, Evidence (A)
C-Reactive Protein, Erythrocyte Sedimentation Rate, and Other Non-Specific Inflammatory Markers	Erythrocyte sedimentation rate and other inflammatory markers for screening for inflammatory disorders with reasonable suspicion of inflammatory disorder in patients with subacute or chronic shoulder pain. – Recommended, Insufficient Evidence (I) However, ordering of a large, diverse array of anti-inflammatory markers without targeting a few specific disorders diagnostically is not recommended.
X-ray	X-ray for evaluation of acute, subacute or chronic shoulder pain – Recommended, Insufficient Evidence (I) X-ray to diagnose rotator cuff tears – Recommended, Insufficient Evidence (I) X-ray to diagnose shoulder dislocation or instability – Recommended, Insufficient Evidence (I) X-ray to diagnose acromioclavicular sprains or dislocations – Recommended, Insufficient Evidence (I) X-ray to diagnose degenerative joint disease – Recommended, Insufficient Evidence (I) X-ray to diagnose adhesive capsulitis – Recommended, Insufficient Evidence (I) X-ray to screen for fracture of the humerus, clavicle, scapula, cervical spine, and/or chest in patients with brachial plexus injury – Recommended, Insufficient Evidence (I)
Arthroscopy	Diagnostic arthroscopy for evaluation of select patients with shoulder pain, including subsequent definitive

Test	Recommendation(s)
	operative approaches – Recommended, Insufficient Evidence (I)
	Arthroscopy for the evaluation of shoulder osteoarthrosis, particularly when an associated disorder is felt to be present, symptomatic, and treatable – Recommended, Insufficient Evidence (I)
Bone Scanning	Bone scanning for select use to evaluate acromioclavicular joint pain or where there is more than one joint to be evaluated in acute, subacute or chronic pain to assist in the diagnosis of osteonecrosis and other conditions with increased polyostotic bone metabolism – Recommended, Insufficient Evidence (I) Bone scanning for routine use in shoulder joint evaluations. – Not Recommended, Insufficient Evidence (I)
Computerized Tomography (CT)	Routine CT for evaluation of acute, subacute, or chronic shoulder pain – Not Recommended, Insufficient Evidence (I) CT to diagnose shoulder dislocation or instability – Recommended, Insufficient Evidence (I) Routine CT for the evaluation of complex proximal humeral and glenoid/scapular fractures – Recommended, Insufficient Evidence (I) CT for evaluation of select patients with osteonecrosis, particularly in whom subchondral fractures are being sought, and for those who need advanced imaging, but have contraindications for magnetic resonance imaging (MRI). – Recommended, Insufficient Evidence (I)
Helical CT Scans	Routine helical CT for evaluation of acute, subacute or chronic shoulder pain – Not Recommended, Insufficient Evidence (I) Helical CT for evaluation of patients with osteonecrosis who have contraindications for MRI – Recommended, Insufficient Evidence (I) Helical CT is recommended for select patients with acute, subacute or chronic shoulder pain in whom advanced imaging of bony structures is thought to potentially be helpful. It is also recommended for those who need advanced imaging, but have contraindications for MRI. – Recommended, Insufficient Evidence (I)
Electromyography (Including Nerve Conduction Studies)	Electrodiagnostic studies to assist in the diagnosis of subacute or chronic peripheral nerve entrapments, including the long thoracic nerve, brachial plexopathies, and suprascapular nerve – Recommended, Insufficient Evidence (I)
Magnetic Resonance Imaging (MRI)	MRI for patients suspected of having acute, clinically significant rotator cuff tears and select patients with subacute or chronic shoulder pain thought to potentially have a symptomatic rotator cuff tear. – Recommended, Insufficient Evidence (I) MRI to diagnose rotator cuff tears – Recommended, Insufficient Evidence (I) MRI for diagnosing osteonecrosis – Recommended, Insufficient Evidence (I) MRI to diagnose shoulder dislocation or instability – Recommended, Insufficient Evidence (I) MRI to diagnose brachial plexopathies – Recommended, Insufficient Evidence (I)
Magnetic Resonance (MR) Arthrogram	MR arthrography to diagnose rotator cuff tears – Recommended, Insufficient Evidence (I) MR arthrography for diagnosing labral tears in patients with subacute or chronic shoulder pain – Recommended, Insufficient Evidence (I) MR arthrography for diagnosing articular side partial thickness rotator cuff tears, subscapularis tears, and labral tears in select patients with subacute or chronic shoulder pain – Recommended, Insufficient Evidence (I) MR arthrography to diagnose superior labral anterior posterior (SLAP) or other labral tears – Recommended, Insufficient Evidence (I)

Test	Recommendation(s)
Ultrasound	Ultrasound for patients suspected of having rotator cuff tears, tendinoses or impingement – Recommended, Insufficient Evidence (I) Ultrasound to diagnose rotator cuff tears – Recommended, Insufficient Evidence (I)

Table 2. Summary of Recommendations for Managing Shoulder Disorders

Shoulder Disorder	Treatment with Evidence Rating/Recommendation Level		
	Recommended	No Recommendation	Not Recommended
Acute, Subacute, Chronic Shoulder Pain	Education (I) Range-of-motion exercises (C) Strengthening exercises (C) Non-steroidal anti-inflammatory drugs (NSAIDs) (A) Acetaminophen (I) Concomitant prescriptions of cytoprotective medications (proton pump inhibitors and misoprostol) for patients at substantially increased risk for gastrointestinal bleeding (A) Concomitant prescriptions of cytoprotective medications (sucralfate) for patients at substantially increased risk for gastrointestinal bleeding (B) Concomitant prescriptions of cytoprotective medications (H2 blockers) for patients at substantially increased risk for gastrointestinal bleeding (C) Discuss the risks and benefits of NSAID therapy for pain with patients with known cardiovascular disease or multiple risk factors for cardiovascular disease. (I) Acetaminophen or aspirin as the first-line therapy as they appear to be the safest regarding cardiovascular adverse effects to use for patients with cardiovascular disease risk factors (A) Judicious use of opioids for acute severe shoulder pain (I) Opioids for select patients with subacute or chronic shoulder pain (I) Muscle relaxants for acute and subacute, moderate to severe shoulder pain from	Aerobic exercise (I) Anti-convulsants including topiramate, gabapentin, and pregabalin for subacute or chronic shoulder pain (I) Topical NSAIDs, topical glyceryl trinitrate, lidocaine patches, eutectic mixture of local anesthetics (EMLA), and other creams/ointments (I) Taping and kinesiotaping (I) Diathermy for acute, subacute or chronic shoulder pain (I) Infrared therapy for acute, subacute or chronic shoulder pain (I)	Norepinephrine reuptake inhibiting anti-depressants for acute shoulder pain (I) Selective serotonin reuptake inhibitors (SSRIs) for acute, subacute, or chronic shoulder pain (I) Anti-convulsants for acute shoulder pain (I) Routine use of opioids for acute, subacute, and chronic non-malignant pain conditions (I) Slings and shoulder supports for subacute or chronic shoulder pain or mild to moderate acute pain (C) Magnets and magnetic stimulation for acute, subacute, and chronic shoulder pain (I) Ultrasound for acute, subacute or chronic shoulder tendinopathy (C) Reflexology (I)

Shoulder Disorder	muscle spasm that is unrelieved by NSAIDs, avoidance of exacerbating exposures or other conservative measures (I)	Treatment with Evidence Rating Recommendation Level	
	Recommended	No Recommendation	Not Recommended
	Norepinephrine reuptake inhibiting anti-depressants for subacute or chronic shoulder girdle pain (I) Capsicum for short-term treatment of acute or subacute shoulder pain, as well as acute flares of chronic shoulder pain as a counter-irritant (I) Slings and shoulder supports for acute severe pain where the appliance is used to briefly rest the shoulder and then promptly, gradually advance the activity level (I) Cryotherapies for home use if efficacious for temporary relief of acute, subacute, chronic, and perioperative shoulder pain (I) Self-application of low-tech heat therapy for acute, subacute and chronic shoulder pain (I)		
Post-operative Pain	Education (I) Range-of-motion exercises (C) Strengthening exercises (C) NSAIDs (C) Acetaminophen (I) Concomitant prescriptions of cytoprotective medications (proton pump inhibitors and misoprostol) for patients at substantially increased risk for gastrointestinal bleeding (A) Concomitant prescriptions of cytoprotective medications (sucralfate) for patients at substantially increased risk for gastrointestinal bleeding (B) Concomitant prescriptions of cytoprotective medications (H2 blockers) for patients at substantially increased risk for gastrointestinal bleeding (C) Discuss the risks and benefits of NSAID therapy for pain with patients with known cardiovascular disease or multiple risk factors for cardiovascular disease. (I) Acetaminophen or aspirin as the first-line therapy as they appear to be the safest	Aerobic exercise (I)	

Shoulder Disorder	Treatment with Evidence Rating/Recommendation Level		
	Recommended	No Recommendation	Not Recommended
	regarding cardiovascular adverse effects to use for patients with cardiovascular disease risk factors (A) Judicious use of opioids (I) Slings and shoulder supports for postoperative shoulder pain where the appliance is used to advance the activity level (I) Acupuncture for post-operative pain and only as an adjunct to more efficacious treatments (C)		
Rotator Cuff Tendinopathies	Education (I) Range-of-motion exercises (C) Strengthening exercises (C) Over-the-counter analgesics (I) Self-application of ice (I) Self-application of heat (I) NSAIDs (A) Acetaminophen (I) Concomitant prescriptions of cytoprotective medications (proton pump inhibitors and misoprostol) for patients at substantially increased risk for gastrointestinal bleeding (A) Concomitant prescriptions of cytoprotective medications (sucralfate) for patients at substantially increased risk for gastrointestinal bleeding (B) Concomitant prescriptions of cytoprotective medications (H2 blockers) for patients at substantially increased risk for gastrointestinal bleeding (C) Discuss the risks and benefits of NSAID therapy for pain with patients with known cardiovascular disease or multiple risk factors for cardiovascular disease (I) Acetaminophen or aspirin as the first-line therapy as they appear to be the safest regarding cardiovascular adverse effects to use for patients with cardiovascular disease risk factors (A) Norepinephrine reuptake inhibiting anti-depressants for select cases of rotator cuff	Aerobic exercise (I) Oral glucocorticosteroids (I) Low-level laser therapy (I) Massage (I) Electrical therapies outside of research settings (I) Subacromial ethylenediaminetetraacetic acid (EDTA) mesotherapy for shoulder calcific tendinitis (I) Subacromial viscosupplementation injections for chronic rotator cuff tendinopathies (I) Needling with or without extracorporeal shockwave therapy for calcific rotator cuff tendinitis (I) Tissue augmentation to surgically repair large or massive tears that are otherwise unrepairable (I)	Slings and braces (I) Pulsed electromagnetic field (B) Reflexology (I) Interferential therapy (C) Extracorporeal shockwave therapy for acute or subacute noncalcific rotator cuff tendinitis (I) Extracorporeal shockwave therapy for chronic non-calcific rotator cuff tendinitis (C) Rotator cuff repair for chronic massive tears (>5 cm) (I) Porcine small intestine submucosa graft for surgical repair of large or massive tears that are otherwise unrepairable (C)

Shoulder Disorder	Treatment with Evidence Rating/Recommendation Level		
	Recommended	No Recommendation	Not Recommended
	tendinopathy (I) Acupuncture for select use in chronic rotator cuff tendinopathies and only as an adjunct to more efficacious treatments (C) Manual therapy, manipulation, and mobilization for acute, subacute or chronic rotator cuff tendinopathies (I) Ultrasound for calcific tendinitis (C) Extracorporeal shockwave therapy for calcific rotator cuff tendinitis (A) Subacromial glucocorticosteroid injections for acute, subacute, or chronic rotator cuff tendinopathies – including rotator cuff tendinoses, supraspinatus tendinitis, impingement syndrome, and subacromial bursitis (B) Arthroscopic removal/excision of bursa for calcific rotator cuff tendinitis (C) Rotator cuff repair for small, medium, and large tears (<5 cm) (B) Adding subacromial decompression to a rotator cuff repair for treatment of isolated supraspinatus tears with a Type II or III acromion (I) Rotator cuff repair for acute massive (>5 cm) tears (C) Subacromial decompression surgery for select patients with impingement syndrome/rotator cuff tendinoses (C) Post-operative exercise or rehabilitation program for post-operative rotator cuff tendinopathy patients (C) Post-operative acupuncture particularly for post-operative rotator cuff tendinopathy patients with significant pain as an adjunct to an active exercise rehabilitation program (C)		
Bicipital Tendon Tears	Surgery for select patients (I)		
Pectoral Strains and Tears	Surgery for patients with complete tears or ruptures of the pectoralis insertion (I)		
Shoulder Dislocation and Instability	Over-the-counter analgesics for shoulder dislocation (I) Self-application of heat or ice for shoulder	Muscle relaxants, capsicum, tricyclic anti-depressants, dual reuptake inhibiting antidepressants, or gabapentin to control pain associated with acute or subacute shoulder	Opioids for pain management for patients with subacute or chronic

Shoulder Disorder	Treatment with Evidence Rating/Recommendation Level		
	Recommended	No Recommendation	Not Recommended
	dislocation (I) Slings, especially an external rotation brace, for initial treatment acutely for shoulder dislocation (C) NSAIDs and acetaminophen for acute, subacute, or chronic shoulder dislocations or for use post-operatively (I) Judicious short-term use of opioids for pain management for select patients with acute moderate to severe pain associated with shoulder dislocation (I) Judicious short-term use of opioids for acute, severe post-operative pain due to shoulder dislocation (I) Muscle relaxants, capsicum, tricyclic antidepressants or dual reuptake inhibiting anti-depressants (but not selective serotonin reuptake inhibitor [SSRIs] anti-depressants which are not effective for nociceptive pain) to control chronic pain associated with shoulder instability (I) Slings for acute rehabilitation of acute shoulder dislocations (I) Self-application of heat or cryotherapies for symptom modulation for shoulder dislocation (I) Acupuncture for chronic pain from shoulder instability (I) Education and exercise for shoulder dislocation and instability (I) Relocation is recommended after dislocation. Relocation under anesthesia is recommended if an attempted relocation without anesthesia is unsuccessful. (I) Arthroscopic or open surgery for acute, first traumatic anterior shoulder dislocation (C) Inferior capsular shift procedure or capsular plication or superior shift of redundant inferior capsule for multidirectional and posterior instability (I) Accelerated rehabilitation (compared with standard rehabilitation) for select patients after arthroscopic Bankart repairs (C) Rehabilitation for patients undergoing surgery for shoulder instability who do not	dislocation or for post-operative pain (I) Diathermy for shoulder dislocation or instability (I) Infrared therapy for shoulder dislocation or instability (I) Ultrasound for shoulder dislocation or instability (I) Laser therapy for shoulder dislocation or instability (I) Manual therapy, mobilization, and manipulation for shoulder dislocation or instability (I) Massage for shoulder dislocation or instability (I) High-voltage galvanic for shoulder dislocation or instability (I) H-wave stimulation for shoulder dislocation or instability (I) Iontophoresis for shoulder dislocation or instability (I) Microcurrent for shoulder dislocation or instability (I) Percutaneous electrical nerve stimulation (PENS) for shoulder dislocation or instability (I) Sympathetic electrotherapy for shoulder dislocation or instability (I) Transcutaneous electrical stimulation (TENS) for shoulder dislocation or instability (I) Accelerated rehabilitation for patients after other surgical procedures for shoulder instability (I) Arthroscopic lavage for shoulder dislocations (I)	pain associated with shoulder dislocation (I) Slings for shoulder instability (I) Taping for shoulder dislocation (I) Magnets for shoulder dislocation (I) Pulsed electromagnetic frequency for shoulder dislocation (I) Interferential therapy for shoulder dislocation (I) Injections for acute shoulder dislocation (I)

Shoulder Disorder	Treatment with Evidence Rating/Recommendation Level		
Superior Labral Anterior Posterior (SLAP) and Other Labral Tears	undergo an accelerated rehabilitation program (I) Over-the-counter analgesics (I) Recommended Self-application of heat or ice (I) Slings for severe symptomatic SLAP or other labral tears (I) NSAIDs and acetaminophen for pain management from SLAP or other labral tears (I) Judicious use of opioids for pain management for select patients with severe pain associated with SLAP or other labral tears (I) Muscle relaxants, capsicum, tricyclic antidepressants or dual reuptake inhibiting anti-depressants for chronic pain (but not SSRI anti-depressants which are not effective for nociceptive pain), or gabapentin for peri-operative use to control pain associated with SLAP or other labral tears (I) Acupuncture to control pain associated with SLAP or other labral tears (I) Arthroscopic or open surgery (I) Rehabilitation for patients after arthroscopic or open labral and SLAP tear repairs (I)	Diathermy (I) No Recommendation Infrared therapy (I) Ultrasound (I) Laser therapy (I) Manual therapy, mobilization, manipulation (I) Massage (I) High-voltage galvanic (I) H-wave stimulation (I) Iontophoresis (I) Microcurrent (I) Percutaneous electrical nerve stimulation (PENS) (I) Sympathetic electrotherapy (I) Transcutaneous electrical stimulation (TENS) (I)	Taping (I) Not Recommended Magnets (I) Pulsed electromagnetic frequency (I) Interferential therapy (I) Injections for acute, isolated labral or SLAP tears (I)
Acromioclavicular Sprains or Dislocations	Over-the-counter analgesics (I) Self-application of heat or ice (I) Slings (I) Over-the-counter medications such as NSAIDs and acetaminophen, and particularly NSAIDs, to control pain associated with acromioclavicular sprains or dislocations (I) Judicious use of opioids for pain management for select patients with severe acromioclavicular sprains or separations (I) Slings or shoulder immobilizers, but not compressive immobilizers, for severe acromioclavicular sprains or dislocations (I) Therapy, including exercises and education, for patients with severe acromioclavicular sprains or dislocations or who are in need of surgery (I)	Diathermy (I) Infrared therapy (I) Ultrasound (I) Laser therapy (I) Manual therapy, mobilization, manipulation (I) Massage (I) High-voltage galvanic (I) H-wave stimulation (I) Iontophoresis (I) Microcurrent (I) PENS (I) Sympathetic electrotherapy (I) TENS (I)	Taping (I) Magnets (I) Pulsed electromagnetic frequency (I) Interferential therapy (I) Injections for acute isolated acromioclavicular sprains or dislocations (I) Routine surgical repair for Grade III acromioclavicular joint separations (B)

Shoulder Disorder	Treatment with Evidence Rating/Recommendation Level		
	Recommended	No Recommendation	Not Recommended
	An injection is recommended prior to consideration of distal clavicle resection for patients with ongoing pain of at least 6 to 12 months to ascertain whether the injection will resolve the pain and, if the pain recurs, whether distal clavicle resection might be successful and should be recommended provided there is no acromioclavicular instability (I) Surgical repair for Grades IV to VI acromioclavicular joint separation (I) Surgical repair for highly select patients with Grade III acromioclavicular joint separations (I) Non-operative management for patients with Grade I to II acromioclavicular joint sprains (I) Rehabilitation for patients after surgical repair of acromioclavicular (AC) separation (I)		
Shoulder (Glenohumeral and Acromioclavicular Joint) Osteoarthrosis	Over-the-counter analgesics (I) NSAIDs and acetaminophen to manage pain from osteoarthrosis (C) Judicious use of opioids for pain management for select patients with severe osteoarthrosis (I) Capsicum, tricyclic antidepressants or dual reuptake inhibiting antidepressants for chronic pain (but not SSRI antidepressants which are not effective for nociceptive pain), and gabapentin for peri-operative use are recommended for select use to control pain associated with osteoarthrosis (I) Slings and functional braces for postoperative treatment of osteoarthrosis (I) Acupuncture for select use in patients with chronic or post-operative osteoarthrosis as an adjunct to more efficacious treatments (C) Intraarticular glucocorticosteroid injections (I) Intraarticular glenohumeral viscosupplementation injections (I) Arthroscopy, particularly when an associated disorder is felt to be present,	Self-application of heat or ice (I) Over-the-counter nutraceuticals (glucosamine, chondroitin, and methylsulfonylmethane) to control pain (I) Manual therapy, mobilization, manipulation (I) Massage (I) Diathermy (I) Infrared therapy (I) Ultrasound (I) Laser therapy (I) High-voltage galvanic (I) H-wave stimulation (I) Iontophoresis (I) Microcurrent (I) PENS (I) Sympathetic electrotherapy (I) Interferential therapy (I) TENS (I)	Slings (I) Magnets and magnetic stimulation (I) Pulsed electromagnetic frequency (I) Taping (I) Prolotherapy injections (I) Chondroplasty (I)

Shoulder Disorder	Treatment with Evidence Rating/Recommendation Level		
	Recommended	No Recommendation	Not Recommended
	symptomatic, and treatable (I) An injection is recommended prior to consideration of distal clavicle resection (arthroscopic or open approach) for acromioclavicular joint pain (C) Total shoulder arthroplasty or hemiarthroplasty for moderate to severe arthritides. (B) Humeral resurfacing (similar to humeral head replacement) is recommended as an option. (I)		
Proximal Humeral Fractures	Non-operative treatment for most patients with non-or minimally displaced fractures (I) Surgical intervention for select patients with displaced fractures (I) Arthroplasty, most commonly hemiarthroplasty, for select patients with displaced proximal humeral fractures (I) Early mobilization for most stable, proximal humeral fracture patients (A) Education and exercise (A) Self-training exercise for select patients (B)		
Clavicular Fractures	Non-operative treatment (C) Surgical intervention for select patients (B) Education and exercise for select patients (I)	Post-operative use of low- intensity pulsed ultrasound for all other (non-Type I) clavicle fractures or non-unions (I) Early mobilization (I)	Low-intensity pulsed ultrasound for Type I (mid-shaft) clavicular fractures (B)
Adhesive Capsulitis ("Frozen Shoulder" and "Painful Stiff Shoulder")	Over-the-counter analgesics for significant pain (I) Self-applications of heat and ice for significant pain (I) NSAIDs and acetaminophen for pain management (I) Judicious use of opioids for pain management for select patients with severe adhesive capsulitis (I) Oral glucocorticosteroids (C) Muscle relaxants, capsicum, tricyclic antidepressants or dual reuptake inhibiting anti-depressants for chronic pain (but not SSRI antidepressants which are not effective for nociceptive pain), and gabapentin for perioperative use for select patients to control pain (I)	Over-the-counter nutraceuticals (glucosamine, chondroitin, and methylsulfonylmethane) (I) Infrared therapy (I) Ultrasound (I) Laser therapy (I) High-voltage galvanic (I) H-wave stimulation (I) Iontophoresis (I) Microcurrent (I) PENS (I) Sympathetic electrotherapy (I) Interferential therapy (I) TENS (I)	Slings and braces (I) Magnets (C) Pulsed electromagnetic frequency (I) Taping (I)

Shoulder Disorder	Treatment with Evidence Rating/Recommendation Level		
	Recommended	No Recommendation	Not Recommended
	Education, exercise, and therapy (C) Continuous passive motion in conjunction with a home exercise program (C) Mobilization and/or manual therapy (B) Manipulation under anesthesia in select patients (C) Acupuncture in select patients (C) Shortwave diathermy (C) Glucocorticoid injections (A) Suprascapular nerve blocks (C) Hydrodilatation in select patients (I) Arthroscopy for select cases (I) Open release surgery for select patients (I)		
Osteonecrosis	Bisphosphonates (I) NSAIDs for pain management (I) Core decompression (I) Arthroplasty (I)	Hyperbaric oxygen (I)	Glucocorticoids, including injections (I)
Brachial Plexus Injuries	In the absence of quality evidence, it is recommended that brachial plexopathies be treated as neuropathic pain and managed according to the recommendations in the American College of Occupational and Environmental Medicine guideline, "Chronic Pain." Physical therapy and/or exercise therapy to maintain range of motion is recommended. Parsonage Turnor syndrome presents with initial severe pain that resolves with residual weakness following.		
Trigger Points/Myofascial Pain	Aerobic exercise (I) Stretching exercises for trigger points/myofascial pain, accompanied by a loss of joint range of motion, to increase connective and muscle tissue extensibility and to attempt to increase overall capacity and activity tolerance (I) Strengthening exercises to increase capacity and activity tolerance (I) Inclusion of fear avoidance belief training during the course of treatment (I) NSAIDs for acute, subacute, or chronic myofascial pain/trigger points. Acetaminophen may be a reasonable alternative (I) Concomitant prescriptions of cytoprotective medications (proton pump inhibitors and misoprostol) for patients at substantially	Yoga (I) Use of duloxetine for the treatment of muscle tenderness and trigger points. A trial of duloxetine may be considered after other treatments with documented efficacy (e.g., different NSAIDs, aerobic exercise, targeted range of motion exercise, norepinephrine reuptake inhibitor antidepressants [TCAs]) have been attempted. However, use is generally not warranted. (I) Gabapentin or pregabalin (I) Home use of cryotherapies (I) Taping and kinesiotaping (I) Low-level laser therapy (I) Manipulation and mobilization (I) Myofascial release – it may be used as an option in place of trigger point injections – should not to	Aquatic therapy (I) Selective serotonin reuptake inhibitors, bupropion, or trazodone (I) Anti-convulsant agents (I) Glucocorticosteroids administered by systemic or topical routes (I) Muscle relaxants (I) Opioids for muscle tenderness (myalgias) or myofascial pain (I) Magnets and magnetic stimulation

Shoulder Disorder	increased risk for gastrointestinal bleeding (A) Treatment with Evidence Rating/Recommendation Level	exceed 4-6 treatments (I) TENS (I)	(I) Diathermy (I)
	Recommended	No Recommendation Biofeedback (I)	Not Recommended Provider-based infrared therapy (I)
	Concomitant prescriptions of cytoprotective medications (sucralfate) for patients at substantially increased risk for gastrointestinal bleeding (B) Concomitant prescriptions of cytoprotective medications (H2 blockers) for patients at substantially increased risk for gastrointestinal bleeding (C) Discuss the risks and benefits of NSAID therapy for pain with patients with known cardiovascular disease or multiple risk factors for cardiovascular disease (I) Acetaminophen or aspirin as the first-line therapy as they appear to be the safest regarding cardiovascular adverse effects to use for patients with cardiovascular disease risk factors (A) Norepinephrine reuptake inhibitor antidepressants (TCAs) for more severe cases (I) Acupuncture for select use in chronic moderate to severe chronic trigger points/myofascial pain as an adjunct to more efficacious treatments (C) Self-application of low-tech heat therapy (I) Massage for select use in patients with trigger points/myofascial pain as an adjunct to active treatments consisting primarily of a graded aerobic and strengthening exercise program (I) Trigger point injections consisting solely of a topical anesthetic such as bupivacaine as a second or tertiary option for subacute or chronic trigger points that are not resolving (C) Psychological evaluation as part of the evaluation and management of patients with trigger points/myofascial pain to assess whether psychological factors will need to be considered and treated as part of the overall treatment plan (I)		Ultrasound (C) Use of mechanical massage devices applied by rehabilitation service providers or massage therapists to administer massage (C) High voltage galvanic (I) H-wave stimulation (I) Interferential therapy (I) Microcurrent (I) Iontophoresis (I) PENS (I) Glucocorticosteroids for use in trigger point injections (C) Botulinum injections (B)

Table 3. Summary of Recommendations for Ergonomic Interventions for Shoulder Disorders with an Occupational Basis and Return-to-Work Programs

Recommended	No Recommended	Not Recommended
Ergonomic interventions in settings with combinations of risk factors (e.g., high force combined with forward flexion and/or abduction and high repetition) to reduce risk factors for rotator cuff tendinopathies (I) Keyboarding and computer (mousing) breaks for primary prevention and for patients with symptoms of shoulder disorders (I) Forearm support for frequent computer keyboard users for potential prevention of neck and/or shoulder symptoms (C) Ergonomics training in moderate- or high-risk manufacturing settings (I) Return-to-work programs for subacute or chronic shoulder disorders, particularly patients with significant lost time (I)	Ergonomics training for prevention of musculoskeletal disorders (MSDs) in office settings (I)	Mandating the traditional sitting posture at a keyboard or desk with elbows, hips, and knees at 90° of flexion for prevention of shoulder/neck disorders (C) Mandating the traditional sitting posture at a keyboard or desk with elbows, hips, and knees at 90° of flexion for treatment of shoulder/neck disorders (I)

Definitions:

Strength of Evidence Ratings

A = Strong evidence-base: Two or more high-quality studies*

B = Moderate evidence-base: At least one high-quality study or multiple lower-quality studies** relevant to the topic and the working population

C = Limited evidence-base: At least one study of intermediate-quality

I = Insufficient Evidence: Evidence is insufficient or irreconcilable

*For therapy and prevention, randomized controlled trials (RCTs) with narrow confidence intervals and minimal heterogeneity. For diagnosis and screening, cross sectional studies using independent gold standards. For prognosis, etiology or harms, prospective cohort studies with minimal heterogeneity.

**For therapy and prevention, well-conducted cohort studies. For prognosis, etiology or harms, well conducted retrospective cohort studies or untreated control arms of RCTs.

Strength of Recommendations

Recommendation	Evidence Rating	Description of Category
Strongly Recommended	A	The intervention is strongly recommended for appropriate patients. The intervention improves important health and functional outcomes based on high quality evidence, and the Evidence-Based Practice Panel (EBPP) concludes that benefits substantially outweigh harms and costs.
Moderately Recommended	B	The intervention is recommended for appropriate patients. The intervention improves important health and functional outcomes based on intermediate quality evidence that benefits substantially outweigh harms and costs.
Recommended	C	The intervention is recommended for appropriate patients. There is limited evidence that the intervention may improve important health and functional benefits.
Insufficient - Recommended (Consensus-based)	I	The intervention is recommended for appropriate patients and has nominal costs and essentially no potential for harm. The EBPP feels that the intervention constitutes best medical practice to acquire or provide information in order to best diagnose and treat a health condition and restore function in an expeditious manner. The EBPP believes based on the body of evidence, first principles, or collective experience that

Recommendation	Evidence Rating	Description of Category
		patients are best served by these practices, although the evidence is insufficient for an evidence-based recommendation.
Insufficient - No Recommendation (Consensus-based)	I	The evidence is insufficient to recommend for or against routinely providing the intervention. The EBPP makes no recommendation. Evidence that the intervention is effective is lacking, of poor quality, or conflicting and the balance of benefits, harms, and costs cannot be determined.
Insufficient - Not Recommended (Consensus-based)	I	The evidence is insufficient for an evidence-based recommendation. The intervention is not recommended for appropriate patients because of high costs or high potential for harm to the patient.
Not Recommended	C	Recommendation against routinely providing the intervention. The EBPP found at least intermediate evidence that harms and costs exceed benefits based on limited evidence.
Moderately Not Recommended	B	Recommendation against routinely providing the intervention to eligible patients. The EBPP found at least intermediate evidence that the intervention is ineffective, or that harms or costs outweigh benefits.
Strongly Not Recommended	A	Strong recommendation against providing the intervention to eligible patients. The EBPP found high quality evidence that the intervention is ineffective, or that harms or costs outweigh benefits.

Clinical Algorithm(s)

The following clinical algorithms are provided in the original guideline document:

- ACOEM Guidelines for Care of Acute and Subacute Occupational Shoulder Disorders
- Initial Evaluation of Occupational Shoulder Disorders
- Initial and Follow-up Management of Occupational Shoulder Disorders
- Evaluation of Slow-to-Recover Patients with Occupational Shoulder Disorders (Symptoms >4 Weeks)
- Surgical Considerations for Patients with Anatomic and Physiologic Evidence of Shoulder Instability, Complete Rotator Cuff Tear or Impingement Syndrome Coupled with Persistent Complaints
- Further Management of Occupational Shoulder Disorders
- Management of Trigger Points/Myofascial Pain

Scope

Disease/Condition(s)

Shoulder disorders

Guideline Category

Diagnosis

Evaluation

Management

Rehabilitation

Treatment

Clinical Specialty

Family Practice

Internal Medicine

Orthopedic Surgery

Physical Medicine and Rehabilitation

Preventive Medicine

Surgery

Intended Users

Advanced Practice Nurses

Allied Health Personnel

Health Care Providers

Occupational Therapists

Physical Therapists

Physician Assistants

Physicians

Utilization Management

Guideline Objective(s)

- To describe evidence-based best practices for key areas of occupational medical care and disability management
- To improve or restore the health of workers with occupationally related illnesses or injuries
- To improve the quality of occupational medical care and disability management

Target Population

Adults with potentially work-related shoulder disorders seen in primary care settings

Interventions and Practices Considered

Diagnosis/Evaluation

1. Antibody tests
2. C-reactive protein, erythrocyte sedimentation rate, other inflammatory marker tests
3. X-ray
4. Arthroscopy
5. Bone scanning
6. Computerized tomography (CT)
7. Helical CT
8. Electromyography (including nerve conduction studies)
9. Magnetic resonance imaging (MRI)
10. Magnetic resonance arthrography
11. Ultrasound

Management/Treatment

1. Activity modification/exercise
    - Range-of-motion exercises
    - Strengthening exercises
    - Continuous passive motion with home exercise program
    - Aerobic exercises
2. Medications
    - Non-steroidal anti-inflammatory drugs
    - Acetaminophen
    - Cytoprotective medications (proton pump inhibitors, misoprostol, H2 blockers)
    - Aspirin
    - Opioids
    - Muscle relaxants
    - Antidepressants (norepinephrine reuptake inhibitor antidepressants [tricyclic anti-depressants], serotonin and norepinephrine reuptake inhibitors [dual reuptake inhibitors])
    - Capsicum
    - Systemic glucocorticosteroids
    - Glucocorticoid injections
    - Bisphosphonates
    - Suprascapular nerve blocks
    - Trigger point anesthetic injections
3. Physical methods
    - Slings and shoulder supports
    - Cryotherapy
    - Heat therapy
    - Ice/heat
    - Acupuncture
    - Mobilization/manual therapy
    - Manipulation
    - Shortwave diathermy
    - Hydrodilatation
    - Massage
4. Relocation
5. Surgery
    - Arthroscopic removal of bursa
    - Rotator cuff repair (with or without subacromial decompression)
    - Artificial disc replacement
    - Repair of joint separation
    - Total shoulder arthroplasty or hemiarthroplasty
    - Core decompression
    - Open release
6. Viscosupplementation injections
7. Behavioral methods
    - Fear avoidance belief training
    - Psychological evaluation
8. Ergonomic interventions
    - Keyboarding and computer breaks
    - Forearm support
    - Ergonomics training
    - Return-to-work programs
9. Patient education

Major Outcomes Considered

- Time to return to work

- Symptom relief

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

The following databases were searched from 1966 to 2010:

- The National Library of Medicine's MEDLARS database (Medline) (www.nlm.nih.gov)
- EBM Online (www.bmjjournals.com)
- The Cochrane Central Register of Controlled Trials (http://www.thecochranelibrary.com/view/0/index.html)
- TRIP Database (www.tripdatabase.com)
- CINAHL (nursing, allied health, physical therapy, occupational therapy, social services: http://www.cinahl.com/wpages/login.htm)
- EMBASE (www.embase.com/)
- PEDro (www.pedro.fhs.usyd.edu.au/)

Ranking and Preliminary Screening of Studies

Primary sources selected for inclusion in the evidence base for American College of Occupational and Environmental Medicine (ACOEM) products and services are limited to those with the strongest apparent study design, pending quality rating. The strength and quality of study design are determined by ranking and rating of the studies according to accepted methods. Generally accepted ranking of study design for diagnostic testing and clinical treatment methods were modified by the Guideline Methodology Committee (GMC). Systematic reviews in general are not ranked as the best design in reality, as most reviews located during pilot testing of the Methodology, with the exception of many (but not all) Cochrane reviews, did not use systematic searches or quality assessments of included studies. The GMC also excluded level 4 evidence from consideration (case series, poor-quality cohort studies, poor-quality case-control studies, expert opinion without explicit critical appraisal, and expert opinion based on physiology, bench research, first principles). The focus was on the best-designed original studies, pending quality grading. For example, studies of diagnostic tests are generally limited to those compared to an acceptable gold standard, and those reporting sensitivity and specificity. Studies of clinical treatment methods are generally limited to randomized controlled trials or crossover trials. Additional literature was also reviewed when there was a paucity of higher-grade literature or if it was brought to Evidence-based Practice Panel's (EBPP's) attention from interested parties.

To narrow the data discovered in the search to that which will be acceptable for further analysis and quality rating, researchers use additional preliminary screening criteria for original research.

Criteria for Inclusion in Study Rating and Critical Analysis of Studies of Diagnosis/Clinical Assessment Methods

1. Evaluate the efficacy (i.e., clinical accuracy) of the assessment method (i.e., the "test") in a group that contains subjects both with and without the condition the test is intended to assess.
2. Be a prospective cohort study or an arm of a randomized controlled trial (RCT).
3. Compare the findings of the assessment method (test) to an adequate reference standard for all subjects (not just subjects who tested positive).

Criteria for Inclusion in Study Rating and Critical Analysis of Studies of Treatment Efficacy

1. Evaluate a group of subjects with a representative spectrum of the clinical condition of interest.
2. Be an RCT evaluating clinical outcomes in a group receiving the intervention compared to a comparison group receiving either no intervention or a different intervention.
3. Evaluate functional outcomes that are important to a patient's overall health or well being or are important to society.

Searches are documented, listing the database searched, the search terms, article type and limits, the time frame searched (in this case, all years in the databases), the number of studies found, the number reviewed in detail, and the number included in the systematic analysis. Despite multiple database searches, many additional studies are discovered in exhaustive manual searches of article reference lists.

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Strength of Evidence Ratings

A = Strong evidence-base: Two or more high-quality studies*

B = Moderate evidence-base: At least one high-quality study or multiple lower-quality studies** relevant to the topic and the working population

C = Limited evidence-base: At least one study of intermediate-quality

I = Insufficient Evidence: Evidence is insufficient or irreconcilable

*For therapy and prevention, randomized controlled trials (RCTs) with narrow confidence intervals and minimal heterogeneity. For diagnosis and screening, cross sectional studies using independent gold standards. For prognosis, etiology or harms, prospective cohort studies with minimal heterogeneity.

**For therapy and prevention, well-conducted cohort studies. For prognosis, etiology or harms, well conducted retrospective cohort studies or untreated control arms of RCTs.

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Study Assessment and Quality Rating

Studies are first abstracted into evidence tables for easier assessment. See Appendix B in the methodology companion (see the "Availability of Companion Documents" field) for a sample of an evidence table for treatment studies. Each study is formally graded for quality using a modification of the most recent assessment scheme proposed by the Cochrane Collaboration Back Group, as shown in the table below. The studies are quality rated using a 0, 0.5, 1 grade for each item, where 0 = does not fulfill the requirement; 0.5 = partially fulfills the requirement and 1 = entirely fulfills the requirement. A study with a score less than 4.0 is rated as a poor-quality study; a study with a score between 4.0 and 7.5 is rated as a moderate-quality study. A study with a score of 8.0 or greater is rated as a high-quality study.

Rating Criteria for Randomized Controlled Trials of Treatment Studies

Criterion	Description
Randomization	Assessment of the degree that randomization was both reported to have been performed and successfully achieved through analyses of comparisons of variables between the treatment and control groups

Criterion	Description
Treatment allocation concealed	Concealment of the allocation of patients to various arms of the study from all involved, including patients, clinicians, and researchers
Baseline comparability	Measures how comparable the baseline groups are (e.g., age, gender, prior treatment)
Patient blinded	The patient is not aware which group he or she is in
Provider blinded	The provider is not aware which treatment he or she is delivering
Assessor blinded	The researcher is not aware which group the results apply to
Co-interventions avoided	The degree to which the study design avoided multiple interventions at the same time
Compliance acceptable	Measures the degree of noncompliance with the treatment protocol
Dropout rate	Measures the dropout rate at different periods of time
Timing of assessments	Assessments and reassessments should be performed at the same time from inception for all study groups
Analyzed by intention to treat	Whether the study data was analyzed with an "intention to treat" analysis

Methods Used to Formulate the Recommendations

Expert Consensus

Expert Consensus (Nominal Group Technique)

Description of Methods Used to Formulate the Recommendations

Each recommendation includes citations of the specific scientific literature which supports the recommendation. The recommendations explicitly consider the health benefits, side effects, and risks of the proposed recommendation. Recommendations include the data elements described below.

Content of Recommendations for Diagnostic Testing or Treatment

1. The diagnoses for which the test or treatment is indicated
2. The specific indications for the test or treatment
3. The point in the time course of the problem for which it is appropriate
4. Prior conservative treatment that should be tried first
5. Relative and absolute contraindications to the test or procedure
6. The number of tests or procedures that are appropriate at a given time in the course of the problem
7. The potential benefits of the test or procedure
8. The potential harms, including effects on disability and return to work

The Evidence-based Practice Panels (EBPPs) for each topic area review and discuss draft practice recommendations from the research staff that includes a review of the quality evidence, evidence tables, and summaries. The strength of evidence rating is confirmed by the EBPP responsible for the topic, with review by the Guideline Methodology Committee (GMC). EBPP members may present additional comments related to their clinical opinions and experience for panel consideration. If a unanimous decision is not possible, an EBPP may vote on the rating of the strength of the evidence to determine a consensus. Dissenters to the consensus may draft minority opinions about the strength of evidence. In practice, this has not happened as recommendations have been unanimous.

Formulation of recommendations requires clinical judgment as well as a full evaluation and consideration of the available high-quality evidence. To aid in framing recommendations, the GMC developed a list of "First Principles" based on the Hippocratic Oath ("First Do No Harm"), medical logic, appropriate sequencing and case management, shared decision-making, support of functional recovery, and relative cost-effectiveness. The

First Principles are defined in Table 7 in the methodology companion (see the "Availability of Companion Documents" field). When there is insufficient high-quality evidence of effectiveness or efficacy, or the high-quality evidence is conflicting, and to guide recommendations for alternative tests or treatments when there are several options, these principles are used to guide group decision-making.

The EBPPs then assign a Strength of Recommendation to each recommendation. If a consensus cannot be reached on the recommendation or strength of recommendation, the EBPPs may use nominal group voting if agreement is not possible in the discussion. Once a consensus is reached, the EBPPs will finalize the language and strength rating of the recommendation. If needed and material, a minority opinion can be appended to the recommendation.

Rating Scheme for the Strength of the Recommendations

Strength of Recommendations

Recommendation	Evidence Rating	Description of Category
Strongly Recommended	A	The intervention is strongly recommended for appropriate patients. The intervention improves important health and functional outcomes based on high quality evidence, and the Evidence-Based Practice Panel (EBPP) concludes that benefits substantially outweigh harms and costs.
Moderately Recommended	B	The intervention is recommended for appropriate patients. The intervention improves important health and functional outcomes based on intermediate quality evidence that benefits substantially outweigh harms and costs.
Recommended	C	The intervention is recommended for appropriate patients. There is limited evidence that the intervention may improve important health and functional benefits.
Insufficient - Recommended (Consensus-based)	I	The intervention is recommended for appropriate patients and has nominal costs and essentially no potential for harm. The EBPP feels that the intervention constitutes best medical practice to acquire or provide information in order to best diagnose and treat a health condition and restore function in an expeditious manner. The EBPP believes based on the body of evidence, first principles, or collective experience that patients are best served by these practices, although the evidence is insufficient for an evidence-based recommendation.
Insufficient - No Recommendation (Consensus-based)	I	The evidence is insufficient to recommend for or against routinely providing the intervention. The EBPP makes no recommendation. Evidence that the intervention is effective is lacking, of poor quality, or conflicting and the balance of benefits, harms, and costs cannot be determined.
Insufficient - Not Recommended (Consensus-based)	I	The evidence is insufficient for an evidence-based recommendation. The intervention is not recommended for appropriate patients because of high costs or high potential for harm to the patient.
Not Recommended	C	Recommendation against routinely providing the intervention. The EBPP found at least intermediate evidence that harms and costs exceed benefits based on limited evidence.
Moderately Not Recommended	B	Recommendation against routinely providing the intervention to eligible patients. The EBPP found at least intermediate evidence that the intervention is ineffective, or that harms or costs outweigh benefits.
Strongly Not Recommended	A	Strong recommendation against providing the intervention to eligible patients. The EBPP found high quality evidence that the intervention is ineffective, or that harms or costs outweigh benefits.

Cost Analysis

The guideline developers reviewed published cost analyses.

Method of Guideline Validation

Clinical Validation-Pilot Testing

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

Internal Quality Review

The Guideline Methodology Committee (GMC) assigns a committee member to each Evidence Based Practice Panel (EBPP) as a methodology consultant to assist with adherence to this methodology. The GMC reviews all recommendations for which there are questions about consistency with the defined methodology. If the GMC determines that the approved methodology has not been followed, leading to illogical or untenable recommendations, the GMC engages in direct discussions with the EBPP to reach agreement on revision. If there is no agreement or revision, then the matter will be considered by the American College of Occupational and Environmental Medicine (ACOEM) Board of Directors when the document is submitted for Board review.

External Review

ACOEM conducts external peer review of the ACOEM *Occupational Medicine Practice Guidelines* (APGs) and periodic revisions to 1) assure that all relevant high-quality scientific literature has been found, 2) assure that the important evidence from the relevant scientific literature has been accurately interpreted, 3) solicit opinions on whether the findings and recommendation statements are appropriate and consistent with the evidence, and 4) obtain general information on the conclusions and presentation of materials from external topic experts. Professional and patient organizations, as well as panel members, ACOEM Board of Directors, etc., are invited to nominate external peer reviewers.

Peer reviewers are asked to comment on the completeness of the scientific literature evaluation in their topic area, the clarity and technical accuracy of the APGs evaluation and summary of the evidence, and the appropriateness of the Guideline findings and recommendation statements.

Stakeholder Input

In a cyclical manner, ACOEM will seek stakeholder input to understand the needs and preferences of those who may utilize or be affected by the use of clinical practice guidelines in workplace settings and in the workers' compensation system. ACOEM solicits input from clinicians, health care systems, workers or patients, employers, utilization reviewers, case managers, insurers and third party administrators, attorneys, regulators, and policy makers through a variety of mechanisms. Stakeholders will be asked for comments about their experience using existing clinical practice guidelines and related products and their suggestions for future improvements. They are also asked for input on the use of clinical practice guidelines in clinical care, case management, claim administration, claim adjudication, and in the development of policies and regulations.

To ensure editorial independence in the development process, the stakeholder groups will be asked for input about the APGs, but will not be informed of panel deliberations or shown drafts of practice recommendations before the formal release of the documents. In some cases, a member of a stakeholder group may participate as a member of a Guideline EBPP or may participate in peer review or pilot testing. However, all individuals involved in the APGs development, peer review, and pilot testing are asked to keep all information about the panel's deliberations and conclusions confidential until the APGs are formally released.

Pilot Testing

The guidelines are pilot tested to determine if the recommendations are clear, easy to use, and are generally useful. Pilot testers are not asked if they think the recommendations or process for development was appropriate.

Review by the GMC and the ACOEM Board of Directors

During the entire evidence-based product development process, the GMC will work with the Panels, editors, and research staff to ensure that the evidence-based product methodology is being followed, both in the literature evaluation process and development of conclusion and recommendation statements. The Board of Directors has an opportunity to comment on the Guidelines during the external review period. Their comments are reviewed by the Panel and any necessary changes are made to the Guidelines.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

- Improved efficiency of the diagnostic process including identification of red flags
- Effective treatment resulting in symptom alleviation and cure

Potential Harms

- False-positive or false-negative diagnostic tests
- Risks and complications of surgical procedures and imaging studies (e.g., infection, radiation)
- Acetaminophen carries the risk of hepatic toxicity, particularly among those consuming excessive alcohol.
- Gastrointestinal bleeding and possible increased cardiovascular risk are associated with non-steroidal anti-inflammatory drugs (NSAIDs).
- Adverse effects from opioids appear prominent, especially during introduction and/or dose adjustment including central nervous system (drowsiness, somnolence, fatigue, tolerance) and gastrointestinal tract (constipation, nausea, dyspepsia), as well as cardiovascular, respiratory, dermatologic, endocrine, and musculoskeletal systems effects. Tolerance, addiction and drug-seeking behaviors are common. Approximately 80% of patients experience some adverse effects from opioids and approximately 33% to 66% do not finish a clinical trial with opioids due largely to these adverse effects.
- The adverse effect profile of muscle relaxants is concerning, with central nervous system (CNS) sedation rates ranging from approximately 25% to 50% and a low, but definite, risk of abuse. Thus, prescriptions for skeletal muscle relaxants for daytime use should be carefully weighed against the need to drive vehicles, operate machinery, or otherwise engage in occupations where mistakes in judgment may have serious consequences (e.g., crane operators, air traffic controllers, operators of motorized vehicles, construction workers, etc.).
- Difficulty with tolerating the various types of tape may be problematic for some patients.
- Manipulation under anesthesia (MUA) been shown to result in injuries including hemarthrosis (100%), localized or disseminated synovitis, capsule rupture, superior labral anterior and posterior (SLAP) tears, proximal humerus fracture, rotator cuff tear, and articular damage that have been identified on arthroscopy.

Contraindications

Contraindications

- Magnetic resonance imaging (MRI) is contraindicated with implanted metallic-ferrous devices.
- Total shoulder arthroplasty is contraindicated in young patients.
- Limited motion may indicate adhesive capsulitis or capsular stiffness that would be a contraindication to surgery.

Qualifying Statements

Qualifying Statements

The American College of Occupational and Environmental Medicine (ACOEM) provides this segment of guidelines for practitioners and notes that decisions to adopt particular courses of actions must be made by trained practitioners on the basis of the available resources and the particular

circumstances presented by the individual patient. Accordingly, the American College of Occupational and Environmental Medicine disclaims responsibility for any injury or damage resulting from actions taken by practitioners after considering these guidelines.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Clinical Algorithm

Mobile Device Resources

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

Shoulder disorders. In: Hegmann KT, editor(s). Occupational medicine practice guidelines. Evaluation and management of common health problems and functional recovery in workers. 3rd ed. Elk Grove Village (IL): American College of Occupational and Environmental Medicine (ACOEM); 2011. p. 1-297. [1977 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

1997 (revised 2011)

Guideline Developer(s)

American College of Occupational and Environmental Medicine - Medical Specialty Society

Source(s) of Funding

American College of Occupational and Environmental Medicine

Guideline Committee

Evidence-based Practice Shoulder Panel

Composition of Group That Authored the Guideline

Panel Members: Laura Rachel Kaufman, MD, PhD (*Chair*); Andrew Green, MD; Nelson S. Haas, MD, MPH, FACOEM; Harold Hoffman, MD, FRCPC; J. Mark Melhorn, MD, FAAOS, FACOEM, FAADEP, FACS, FASSH, FAAHS; Lori A. Michener, PhD, PT, ATC; Kaochoy Saechao, MD, MPH; Robert W. Watson, Jr., MD, MPH

Financial Disclosures/Conflicts of Interest

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Family Medicine Physician, Urgent Care and Occupational Medicine Physician and Consultant, Group Health Permanente/Group Health Cooperative

National, Regional, Local Committee Affiliations—None

Guidelines Related Professional Activities—Past Member, Best Practices Workshop: Combined Effects of Chemicals and Noise on Hearing, NHCA and CDC/NIOSH

Research Grants/Other Support—None

Financial/Non-Financial Conflict of Interest—None

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National, Regional, Local Committee Affiliations—American Academy of Orthopaedic Surgeons: Committee on Evaluation; Council of Musculoskeletal Subspecialty Societies; and Publications Committee; Rhode Island Hospital Surgical Clinical Practice and Patient Safety Committee

Guidelines Related Professional Activities—Study Group/Committee for Clinical Practice Guidelines for Rotator Cuff Tear, American Academy of Orthopaedic Surgeons

Research Grants/Other Support—Smith and Nephew

Financial/Non-Financial Conflict of Interest—Tornier, Inc. (consultant, royalties, research support); Smith and Nephew (fellowship/educational support); Arthrex, Inc. (fellowship/educational support); Linvatec, Inc. (fellowship/educational support); Synthes, Inc. (fellowship/educational support); Editorial – Deputy Editor *Journal of Bone and Joint Surgery*; Consultant Reviewer, *Journal of Shoulder and Elbow Surgery*, *Clinical Orthopaedics and Related Research*, *Journal of Orthopaedic Trauma*

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Guidelines Related Professional Activities—None reported

Research Grants/Other Support—None

Financial/Non-Financial Conflict of Interest—None

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National, Regional, Local Committee Affiliations—None

Guidelines Related Professional Activities—Member, Practice Guidelines Committee, ACOEM (2nd Edition); Medical Advisory Board Member/Contributor, Medical Disability Advisor

Research Grants/Other Support—None

Financial/Non-Financial Conflict of Interest—None

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National, Regional, Local Committee Affiliations—Board Chair, Current Past President and Current Chairman of Nomination Committee, and Member of Ethics & Discipline Committee, American Academy of Disability Evaluating Physicians; Member of Occupational Health Committee, Program Director for Expert Witness Program, and Program Director for Occupational Orthopaedics and Workers' Compensation: A Multidisciplinary Perspective, American Academy of Orthopaedic Surgeons

Guidelines Related Professional Activities—Lead Author, Section of Musculoskeletal Upper Extremity, *AMA Guides to the Evaluation of Permanent Impairment*, 6th Edition; Member, Advisory Board, *The Medical Disability Advisor*; Member, Medical Advisory Board, *Official Disability Guidelines* (ODG); Member, Editorial Board, ACOEM's *APG Insights*; Developer and Medical Consultant, CtdMAP (MAP Managers and PHI (Physical Health Index)

Research Grants/Other Support—None

Financial/Non-Financial Conflict of Interest—Member, Advisory Board, *The Medical Disability Advisor*; Member, Medical Advisory Board, Official Disability Guidelines (ODG)

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Associate Professor, Department of Physical Therapy, Virginia Commonwealth University – Medical College of Virginia Campus; Physical Therapist, Virginia Commonwealth University Hospital System

National, Regional, Local Committee Affiliations—Reviewer, *Journal of Orthopedic and Sports Physical Therapy*; Reviewer, *Journal of Physical Therapy*; Reviewer, *Clinical Biomechanics*; Reviewer, *Arthritis Care and Research*; Reviewer, *Journal of Athletic Training*; Grant Reviewer, National Athletic Trainers' Association Research and Education Foundation; Editorial Board Member, British Elbow and Shoulder Society Journal: *Shoulder and Elbow*; Chair, Research Committee, Orthopedic Section, American Physical Therapy Association; Board Member, Orthopedic Section, American Physical Therapy Association

Guidelines Related Professional Activities—Guidelines: American Society of Shoulder and Elbow Therapists' Consensus Rehabilitation Guideline for Arthroscopic Anterior Capsulolabral Repair of the Shoulder; Guidelines Committee for Rehabilitation of Shoulder Rotator Cuff Disease, Instability, and Adhesive Capsulitis, Orthopedic Section, American Physical Therapy Association

Research Grants/Other Support—Co-Principal Investigator, Randomized Clinical Trial of Rehabilitation for Subacromial Impingement

Syndrome, Brooks Rehabilitation (2008-2010); Principal Investigator, Effectiveness of Rehabilitation for Subacromial Impingement Syndrome, National Athletic Trainers' Association Research and Education Foundation (2007-2010)

Financial/Non-Financial Conflict of Interest—None

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National, Regional, Local Committee Affiliations—Council on Occupational and Environmental Medicine Practice, ACOEM; Chair, Membership Committee, WOEMA

Guidelines Related Professional Activities—None

Research Grants/Other Support—None

Financial/Non-Financial Conflict of Interest—None

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National, Regional, Local Committee Affiliations—Vice President/Medical Director, Scientific Committee on Occupational Health and Development, HealthSpan International

Guidelines Related Professional Activities—None

Research Grants/Other Support—None

Financial/Non-Financial Conflict of Interest—None

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Shoulder complaints. Elk Grove Village (IL): American College of Occupational and Environmental Medicine (ACOEM); 2004. 31 p. [68 references]

Guideline Availability

Electronic copies: To order a subscription to APG-I, the online version of the Guidelines, call 847-818-1800 or visit http://www.acoem.org/apg-i.aspx.

Print copies are available from the American College of Occupational and Environmental Medicine (ACOEM), 25 Northwest Point Boulevard, Suite 700, Elk Grove Village, IL 60007 by calling 847-818-1800 or order online at http://www.acoem.org/PracticeGuidelines.aspx.

Subscriptions to ACOEM's Practice Guidelines App are available for iPhone/iPod and iPad interfaces from the iTunes Web site.

Availability of Companion Documents

The following is available:

- Methodology for the update of the occupational medicine practice guidelines, 2nd edition. Elk Grove Village (IL): American College of Occupational and Environmental Medicine (ACOEM); 2008. Available from the ACOEM Web site.

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI on May 30, 2006. The information was verified by the guideline developer on November 3, 2006. This NGC summary was updated by ECRI Institute on July 20, 2012. The updated information was verified by the guideline developer on August 6, 2012. This summary was updated by ECRI Institute on October 28, 2013 following the U.S. Food and Drug Administration advisory on Acetaminophen. This summary was updated by ECRI Institute on September 18, 2015 following the U.S. Food and Drug Administration advisory on non-aspirin nonsteroidal anti-inflammatory drugs (NSAIDs). This summary was updated by ECRI Institute on June 2, 2016 following the U.S. Food and Drug Administration advisory on Opioid pain medicines.

Copyright Statement

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